

### Patent Claims

1. A valve timing mechanism, in particular for four-cycle engines, having the following components:

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- a rocker arm frame (2) which is configured in one piece from lightweight metal and has two bars (34, 35) which are connected by webs (36, 37), for accommodating rocker arms;

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- hydraulic elements (6) for valve clearance compensation which have an outer piston (9) which is open on one side and has a supporting ball (5) which is configured in one piece at the closed end of said outer piston (9), and an inner piston (10) which is open on one side, is guided in the outer piston (9) and is connected in flow terms via a spring-loaded ball valve (12) to a high-pressure space (13) of said outer piston (9);

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- a steel sheet part which is arranged between the hydraulic elements (6) and the rocker arm frame (2);

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- a pressurized oil line which is arranged in the longitudinal extent of the rocker arm frame (2) at the level of the open end of the hydraulic elements (6);

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- deep-drawn steel sheet rocker arms (1) which are configured uniformly for all the valves, having a U-shaped cross section and having cylindrical rollers (3) mounted on needle bearings for at least one camshaft, and having a cap (4) for the supporting ball (5), and having contact elements for the valve stems of the inlet and outlet valves,

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characterized in that the outer pistons (9) of the hydraulic elements (6) are guided in blind bores (8)

of the rocker arm frame (2), and in that a steel disk (11) is arranged at the bottom of the blind bores (8) as a stop for the inner piston (10).

5    2.    The valve timing mechanism as claimed in claim 1,  
characterized in that the diameter of the steel disks  
(11) preferably corresponds to that of the blind bores  
(8), and in that the pressurized oil line is configured  
10    as a pressurized oil bore (14), the center line of  
which is preferably tangent on the circumference of the  
center plane of the steel disks (11) of the hydraulic  
elements (6) which are arranged in an offset manner.

3.    The valve timing mechanism as claimed in claim 2,  
15    characterized in that, on those sides (15, 16) of the  
steel disks (11) which are close to and remote from the  
bottom, matching, preferably radial channels (29) are  
arranged which serve to connect the pressurized oil  
bore (14) to venting bores (17) and to the inner space  
20    (18) of the inner pistons (10).

4.    The valve timing mechanism as claimed in claim 3,  
characterized in that the venting bores (17) in the  
rocker arm frame (2) are preferably arranged in the  
25    center line of the hydraulic elements (6).

5.    The valve timing mechanism as claimed in claim 4,  
characterized in that the outer side of the inner  
pistons (10) has a first circumferential groove (20) in  
30    the overlap region with the inner side of the outer  
pistons (9), said first circumferential groove (20)  
being connected to the inner space (18) of the inner  
pistons (10) via a radial bore (21).

35    6.    The valve timing mechanism as claimed in claim 5,  
characterized in that, on the outer circumference of  
the outer pistons (9) in the region of their open end,  
a second circumferential groove (22) is arranged with a

circlip (23) which latches into a third circumferential groove (24) in the end region of the blind bores (8).

7. The valve timing mechanism as claimed in claim 6,  
5 characterized in that the length of the third circumferential groove (24) corresponds at least to the adjustment path of the hydraulic elements (6).

8. The valve timing mechanism as claimed in claim 7,  
10 characterized in that the cross section of the deep-drawn steel sheet rocker arm (1) is configured as a U-profile which is open at the top and has a profile bottom (25) into which the cap (4) is embossed.

15 9. The valve timing mechanism as claimed in claim 8, characterized in that a cylindrical shaped-out molding (7) having a minimum transverse camber is provided as a contact element for the valve stems at the valve-side end of the steel sheet rocker arms (1) on the outer  
20 side (26) of the profile bottom (25), the center line of said cylindrical shaped-out molding (7) lying parallel to the tilting axis of the steel sheet rocker arm (1).

25 10. The valve timing mechanism as claimed in claim 9, characterized in that two parallel guide rails (28) are preferably formed in one piece with a rectangular cross section and at the distance of the diameter of the valve stems and in the tilting direction of the steel  
30 sheet rocker arms (1) on the outer side (26) of the profile bottom (25) in the region of the cylindrical shaped-out molding (7) in a manner which follows its contour.